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September 25, 2008

Mr. Kyrik Rombough
South Dakota Department of Environment and Natural Resources
Air Quality Division
523 East Capitol
Pierre, SD 57501

Subject: Basin Electric Power Cooperative NextGen Project
Update to PSD Permit Application

Dear Mr. Rombough,

On behalf of Basin Electric, ENSR is submitting an updated summary of the PSD Application for Basin Electric Power Cooperative NextGen Project Appendix 8. Enclosed are three (3) hard copies of an Appendix 8 Addendum, as well as three external hard drives containing copies of all electronic modeling files in support of the Addendum.

This updated modeling reflects the modeling with the GEP stack height (566 feet) with the CALPUFF model, as opposed to the use of the actual stack height (625 feet), which was used in the original CALPUFF modeling. This GEP stack height was correctly used in the AERMOD modeling that accompanied the original application. The revised CALPUFF modeling does not alter the categorical results of the original modeling.

We appreciate your acceptance of these items in support of the referenced air permit application, and will gladly respond to any comments regarding this submittal.

Sincerely yours,

Bruce C. Macdonald
Senior Program Manager

Patrick McKean
Air Quality Modeler

Cc: Cris Miller, Basin Electric
Greg Knauer, Burns & McDonnell
Mary Hauner, Burns & McDonnell

Ref: 02450-017

Enclosures.

8.0 Far-Field Modeling

This addendum provides corrections to the Class I air quality impact analysis (Appendix 8) in the original PSD Permit Application for Basin Electric's NextGen Project that was submitted on July 29, 2008. This addendum details any changes to the modeling which occurred after submission of the application and presents the updated results. Any and all items not explicitly addressed in this addendum are no different from the approach detailed in the application. Table numbers identified in this addendum refer to the table numbers in the original application.

8.1 Facility Emission Units

Modeled corrected stack parameters are shown in **Table 8-2** for the main stack. The location of the stack was revised slightly to correctly convert the UTM Zone 14, NAD83 coordinates provided in the site plan (and as modeled in AERMOD), to Lambert Conformal coordinates. The stack height was corrected to reflect the Good Engineering Practice stack height determined in the BPIP analysis for AERMOD.

Table 8-2 Modeled Stack Parameters

Source	Location in UTM Zone 14 NAD83 [1] (meters)		Stack Height (m)	Base Elevation (m)	Stack Diameter (m)	Exit Velocity (m/s)	Exit Temperature (K)
	Northing	Easting					
Main Stack	413233	5037877	172.6	570.1	8.60	18.30	330.4

[1] The corresponding Lambert Conformal coordinate are 126.836 km east, and -8.431 km north, as input to CALPUFF.

8.2 CALPUFF Modeling Analyses and Results

The PSD-required analyses, consisting of the significant impact determination, PSD increment consumption, and AQRVs, were performed for the mandated Federal Class I areas (Badlands and Theodore Roosevelt NP). Visibility assessments were conducted for additional discrete receptors representing DENR monitoring sites within Wind Cave NP and Badlands NP, along with receptors at campgrounds along the Lewis and Clark Trail in South Dakota.

8.2.1 Significant Impact Determination and Increment Consumption

A significant impact analysis was performed to determine whether the proposed project could cause a significant ambient air quality impact at any potentially affected mandated Federal Class I area. A significant impact is defined as an impact that exceeds 4 percent of the PSD Class I increments, as proposed by USEPA (61 FR 38269). These proposed significant impact levels (SILs) are provided **Table 8-6**, in comparison with predicted project impacts at each mandated Class I area.

Maximum predicted impacts (high-first-high) due to the project were compared to the SILs. All project impacts are below the Class I SILs for all modeled pollutants and averaging periods; therefore a cumulative increment impact analysis was not required or conducted.

Table 8-6 Class I SILs PSD Increment and Predicted Project Impacts

Pollutant	Class I Area	Averaging Period	2004 ($\mu g/m^3$)	2005 ($\mu g/m^3$)	2006 ($\mu g/m^3$)	Class I SIL ($\mu g/m^3$)	PSD Class I Increment ($\mu g/m^3$)
SO_2	Badlands National Park	3-hr	0.371	0.358	0.363	1.0	25
		24-hr	0.100	0.078	0.072	0.2	5
		Annual	0.002	0.002	0.002	0.1	2
	Theodore Roosevelt National Park	3-hr	0.227	0.230	0.220	1.0	25
		24-hr	0.095	0.055	0.062	0.2	5
		Annual	0.002	0.002	0.002	0.1	2
PM_{10} and $PM_{2.5}$	Badlands National Park	24-hr	0.070	0.063	0.052	0.3	8
		Annual	0.001	0.002	0.002	0.2	4
	Theodore Roosevelt National Park	24-hr	0.076	0.038	0.046	0.3	8
		Annual	0.002	0.002	0.002	0.2	4
NO_x	Badlands National Park	Annual	0.001	0.001	0.001	0.1	2.5
	Theodore Roosevelt National Park	Annual	0.001	0.001	0.001	0.1	2.5

8.2.2 CALPUFF Regional Haze

CALPUFF and CALPOST processing were used for the regional haze (visibility) analysis to compute the maximum 24-hour average light extinction at each required Class I area and modeled sensitive Class II areas. Regional haze results for the DENR monitoring locations and Lewis and Clark campgrounds are presented for informational purposes only.

As is shown in **Table 8-7**, the visibility impacts at all mandatory Class I areas (Badlands and Theodore Roosevelt NP only) are below 5 percent of background extinction (reported as number of days with less than 5 percent change in B_{ext}). The Class I areas were analyzed using Method 2. The highest 24-hour change in light extinction is 4.73 percent at Theodore Roosevelt NP. Therefore, the impacts to visibility or regional haze at these sites are deemed insignificant. The changes in light extinction at other locations (campgrounds and monitoring stations) are shown for informational purposes only. Method 6 was used to assess impacts at the Lewis and Clark Trail Campgrounds that are more then 50 km from NextGen. As is shown in **Table 8-8**, the 98^{th} percentile impacts for all analyzed campgrounds are well below the 5 percent extinction level. In summary, the visibility impacts are less than the established significance thresholds for the Class I areas and the selected Class II areas. No further cumulative analyses for Class I areas are required.

8.2.3 Acid Deposition

CALPUFF and CALPOST were applied to obtain upper limit estimates of annual wet and dry deposition of sulfur and nitrogen compounds (kg/ha/yr) associated with emissions from the proposed project at each potentially affected Class I area. Specifically, CALPUFF was used to model both wet and dry deposition of SO_2, SO_4, nitrates (NO_3), nitric acid, and ammonia as well as dry deposition of NO_x to estimate the maximum annual wet and dry deposition of total sulfur and total nitrogen at the Class I areas.

Table 8-7 Visibility Impacts at Class I Areas

Receptor Locations	Method Used for Visibility Calculations	2004		2005		2006	
		Days >5% Δ B_{ext}	Max% Δ B_{ext}	Days >5% Δ B_{ext}	Max% Δ B_{ext}	Days >5% Δ B_{ext}	Max% Δ B_{ext}
Badlands National Park	2	0	3.73	0	2.80	0	4.15
Theodore Roosevelt National Park	2	0	4.73	0	3.72	0	3.41
Badlands Monitoring Station	2	0	3.17	0	1.95	0	2.32
Wind Cave Monitoring Station	2	0	1.87	0	1.29	0	2.66

Table 8-8 Visibility Impacts at Lewis and Clark Trail Campgrounds

Receptor Locations	Method Used for Visibility Calculations[1]	2004		2005		2006	
		Days >5% Δ B_{ext}	98th Percentile Δ B_{ext}	Days >5% Δ B_{ext}	98th Percentile Δ B_{ext}	Days >5% Δ B_{ext}	98th Percentile Δ B_{ext}
Okobojo Point	6	0	1.30	2	1.73	0	1.83
Cow Creek	6	0	1.38	2	1.88	0	2.00
Oahe Downstream	6	0	1.40	2	1.88	0	1.98
Farm Island	6	0	1.36	1	1.65	0	1.68
Westbend	6	1	1.67	0	1.94	1	1.99

[1]In accordance with Method 6, the 98th highest percentile change in B_{ext} is reported instead of maximum percent change in B_{ext} for receptors analyzed using Method 6 for regional haze impacts.

The FLMs also have recently developed a Deposition Analysis Threshold (DAT) of 0.005 kg/ha/yr in the west to be used as a threshold for further FLM analysis, rather than an adverse impact threshold (Porter 2004). Since all potentially affected Class I areas are west of the Mississippi River, the selected DAT for this project is 0.005 kg/ha/yr. **Table 8-9** demonstrates that the predicted combined wet and dry deposition of total sulfur and total nitrogen due to project emissions do not exceed the DAT. The acid deposition rates are well below the established DAT for all modeled compounds at both Class I areas.

Table 8-9 Predicted Project-Related Deposition Of Nitrogen And Sulfur In Mandatory Class I Areas

Acid	Class I Area	Averaging Period	2004 (kg/ha/yr)	2005 (kg/ha/yr)	2006 (kg/ha/yr)
Nitrogen	Badlands National Park	Annual	8.76E-04	8.79E-04	8.49E-04
Nitrogen	Theodore Roosevelt National Park	Annual	8.69E-04	1.32E-03	5.86E-04
Sulfur	Badlands National Park	Annual	1.63E-03	1.78E-03	1.53E-03
Sulfur	Theodore Roosevelt National Park	Annual	1.87E-03	2.97E-03	1.19E-03

8.3 References

Porter, E. 2004. U.S. Fish and Wildlife Service contact. Personal communication with Robert Paine of ENSR.